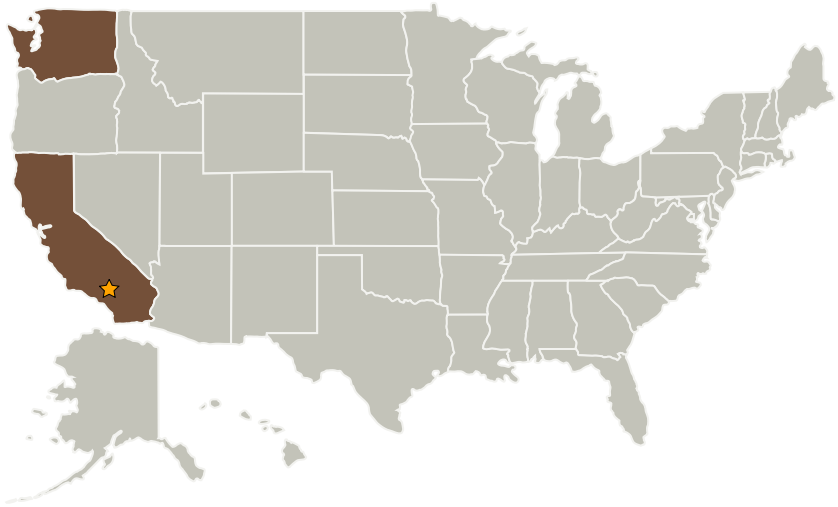
Reduction of Flight Control System/Structural Mode Interaction, Phase I

Completed Technology Project (2005 - 2005)

Project Introduction

A novel approach is proposed for reducing the degree of interaction of a high gain flight control system with the airframe structural vibration modes, representing a complete departure from the traditional approach of using notch filters. In principle it offers similar or better performance than notch filters, while not suffering from the attendant low frequency phase lag that has an adverse effect on pilot handling qualities. Structural mode interaction can be a significant problem in high performance aircraft and other aircraft with low frequency vibration modes. Use of notch filters requires a compromise to be reached between airframe structural stability and handling qualities. Successful application of the proposed method will relieve the flight control system designer of the need for managing this compromise and will allow the achievement of full potential system performance with better handling qualities. Basic feasibility has already been established and Phase I will broadened this to cover practical implementation issues and to define test evaluation plans. Phase II will extend the method into actual test evaluation, either by laboratory test or flight test, or both. Other possible applications such as aircraft active control systems and control of space structures will be considered during the research program.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Armstrong Flight Research Center (AFRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Armstrong Flight Research Center(AFRC)	Lead Organization	NASA Center	Edwards, California
Stirling Dynamics, Inc.	Supporting Organization	Industry	Kirkland, Washington

Primary U.S. Work Locations	
California	Washington

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Robert Stirling

Technology Areas

Primary:

- TX15 Flight Vehicle Systems
  - TX15.1 Aerosciences
    - TX15.1.3 Aeroelasticity